Future Series

Cavefinder

User's manual

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1 Preface

Dear customer,

in the first instance we want to thank you that you made your decision on a product of OKM Ortungstechnik GmbH.

The present product is based on a geo-electric measuring method which can be used to locate cavities in the target area. This is including not only natural but also man-made cavities.

With our team of specialists we guarantee that our products are under recurrent control. Our specialists try to implement new developments in terms of further quality improvements for you.

Of course by selling our products we cannot guarantee that you really make a find during your research. The recognition of hidden objects and structures depends on a hugh number of factors - like you know. Determining factors are the dielectricity constant of the ground, the grade of mineralisation and the dimensions of an object relating to its depth. Specially in very wet soil, clay and sand with high conductivity of the ground, recording of the measured results can be falsified strongly.

With this product you purchased a device which stood the tests in regular operation like all other products of us. If you are interested in where our devices have gone into action please visit our homepage.

For our company it is necessary that we protect our developments within the framework of existing legislation to a patent or trademark registration. Therewith we offer you a higher warranty while using our products.

Please take your time consecutively, read this user‘s manual and familiarize yourself with the utilisation and operation of this Cavefinder.

2 Important Notes

Please read these operating instructions carefully and closely before using *Cavefinder* and its accessories! These instructions give information on how to use the device and point out potential sources of danger.

2.1 General Notes

Being an electronic device, *Cavefinder* has to be treated with the caution and care necessary when such devices are used. Any failure to observe the safety precautions given or any use for purposes other than the ones it is conceived for may result in a damage or destruction of the processing unit and connected components.

The device will get destroyed if it is opened improperly.

2.2 Possible Health Hazards

If used properly the device normally does not pose any health hazards. According to current scientific knowledge, the high-frequency signals are not harmful to the human body on account of their low power.

2.3 Surrounding Area

Having been transferred from a cold to a warmer place, the device should not be operated immediately afterwards. Any condensation, which may have formed, might cause the device to get destroyed. Avoid strong magnetic fields, which may occur in places such as near machines or loudspeakers, and avoid using a detector within a radius of 50 meters.

2.4 Voltage

The power supply should not be outside the indicated range of values. Use only chargers, batteries and rechargable batteries which are included in the scope of delivery.

Never use the 230 Volt mains supply.

3 Technical Specifications

The following technical indications are medial values. During operation small variations are quite possible.

3.1 Control Unit

Dimensions (H x W x D)	430mm x 150mm x 260mm
Weight	about 3kg
Voltage	12 VDC
Processor	Motorola, 4 MHz
Operating Temperature	0°C – 50°C
Storage Temperature	-20°C – 60°C
Air Humidity	5% – 75%
Waterproof	No
Maximal Penetration Depth	about 40 meters[1]

Table 1: Technical Specifications (Control Unit)

3.2 Data Transmission

The following specifications of data transmission are only valid for the model *Cavefinder B*. The *Cavefinder A* does not have a data transmission.

Technology	Bluetooth
Frequency	2.4 – 2.4835 GHz
Maximal Data Transmission Rate	1 Mbps
Receiving Sensitivity	-85 dBm
Maximal Range	about 100 meters

Table 2: Technical Specifications (Data Transmission)

[1] depends on object size and ground conditions

3.3 Computer, Minimum Requirements

The computer is not part of the scope of delivery. The indicated values should help you for a correct selection of a suitable computer for analysis of your measured results.

A computer is only necessary for the usage of *Cavefinder B*. The model *Cavefinder A* does not provide data transmission to pc.

CD-ROM Drive	minimum 4x
COM-Port (Data Transmission)	USB
Free Memory	minimum 20 MB
Working Memory (RAM)	minimum 128 MB
Graphic Card	minimum 64 MB, OpenGL-compatible
Operating System	Windows 98SE, Me, 2000, XP

Table 3: Technical Specifications (Computer, Minimum Requirements)

4 Scope of Delivery

In the following section you can find all standard equipment. The scope of delivery can be different in some circumstances because of some optional accessories which should not be included in the basic equipment.

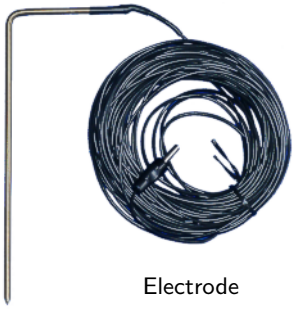
1	Control Unit
4	Electrode (with about 20m cable)
1	User's Manual
1	External Power Supply
1	Charger for External Power Supply
1	Cable for External Power Supply
1	Carrying Case
1	3D Software (standard)*
1	USB Bluetooth Dongle*
1	USB Setup CD*

* only Cavefinder B;

Table 4: Scope of Delivery

Beware that pictures in this manual could be different to delivered parts.

Control Unit



Electrode

USB Bluetooth Dongle *

External Power Supply

Charger for External Power Supply

Cable for External Power Supply

Figure 1: Scope of Delivery

5 Assembly

In this section is explained how to assemble the device and how to prepare a measurement.

Figure 2: Connection of Electrodes

In figure 2 you can see how to connect the electrodes to the device in the right way. Do it without any unnecessary application of force! The detailed discription how to connect the electrodes you can find in section 9 on page 29.

Figure 3: Connection of External Power Supply

In figure 4 you can see how the external power supply has to be connected. Please take care that you use the 12V output of the external power supply for the correct cable connection.

With the model *Cavefinder B* you have the possibility to transfer all measured values to a computer. In figure 4 you can see, how to connect the Bluetooth Dongle with the USB-Port of your computer. Further information about the correct utilisation and installation of the USB driver you can find in section 6 for Toshiba driver or in section 7 for Conceptronic driver.

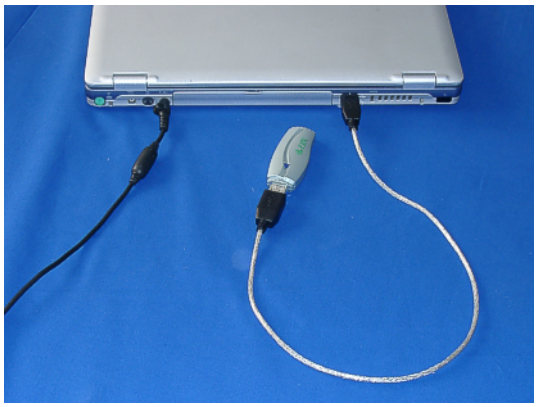


Figure 4: Connection of USB Dongle

6 Installation of Radio Transmission (Toshiba)

This section describes the installation of the USB Bluetooth Dongle. Consider that the represented figures not necessarily agree with the current version of your operating system or the version of your USB installation.

The instructions in this chapter are only valid for the Toshiba usb-drivers. If you are using the Conceptronic usb-drivers, please read chapter 7.

6.1 Install Software & Drivers

Now it is time to install the software and driver on your system. Therefore you have to insert your Bluetooth CD into the CD ROM drive of your computer. If the CD does not start automatically, please double click on Desktop and then double click on the symbol of your CD ROM drive. With a further double click on file `setup.exe` you start the installation.

Figure 5: Bluetooth-Installation

The first window of your installation will open. Click here on the entry *Toshiba Driver* and follow the instructions on the screen.

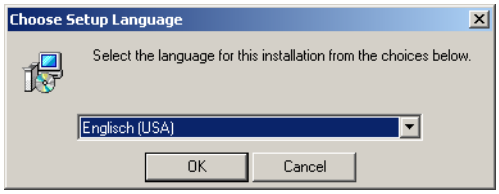


Figure 6: Bluetooth-Installation, Select Language

First there is a possibility to select the language of the installation. Click on *OK*, to change to the installation dialog from figure 7.

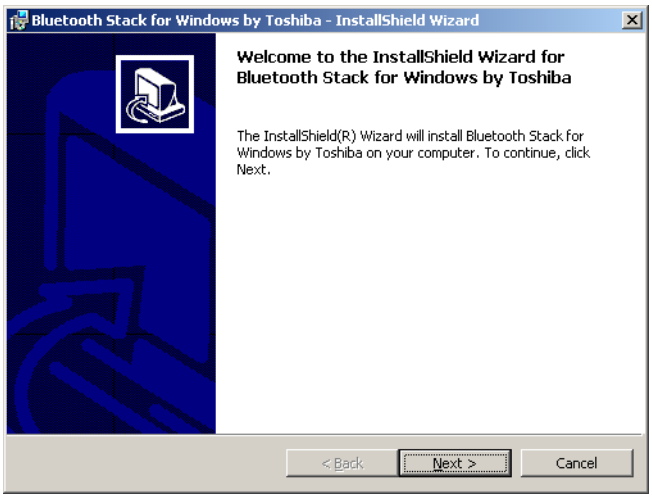

Bluetooth Stack for Windows by Toshiba - InstallShield Wizard
Welcome to the InstallShield Wizard for Bluetooth Stack for Windows by Toshiba
The InstallShield(R) Wizard will install Bluetooth Stack for Windows by Toshiba on your computer. To continue, click Next.
< Back
Next >
Cancel

Figure 7: Bluetooth-Installation, Start

Now simply click on *Next*, to continue the installation. A dialog like in figure 8 appears on your screen.

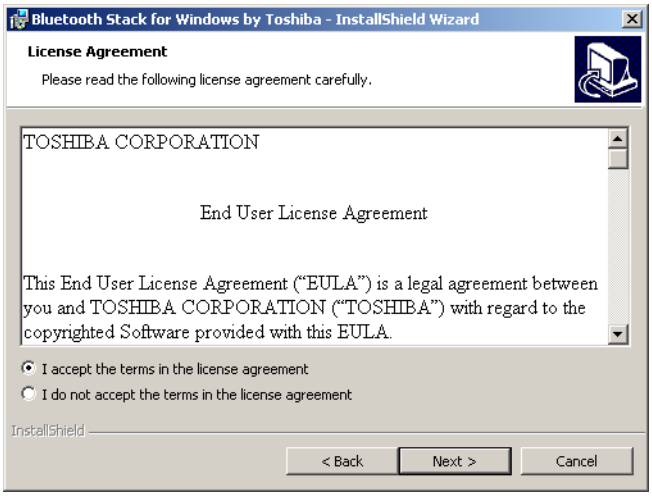

Bluetooth Stack for Windows by Toshiba - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
TOSHIBA CORPORATION
End User License Agreement
This End User License Agreement ("EULA") is a legal agreement between you and TOSHIBA CORPORATION ("TOSHIBA") with regard to the copyrighted Software provided with this EULA.
I accept the terms in the license agreement
I do not accept the terms in the license agreement
InstallShield
< Back
Next >
Cancel

Figure 8: Bluetooth-Installation, Licence Agreement

Select the option *I accept the terms in the licence agreement* and confirm it with a click on *Next*.

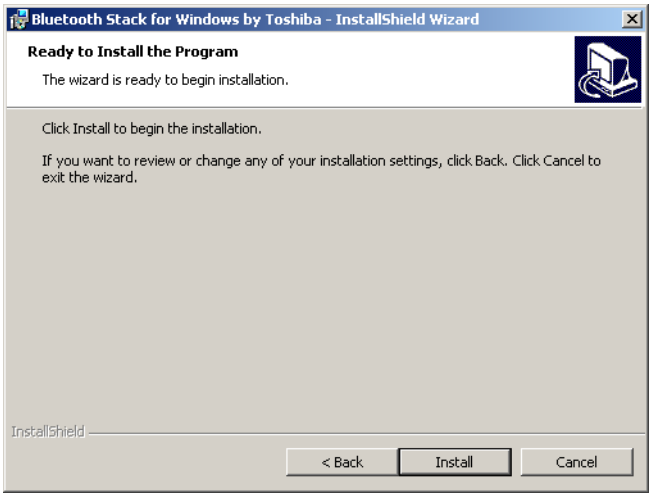

Bluetooth Stack for Windows by Toshiba - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

Figure 9: Bluetooth-Installation, Setup

Click now on the button *Install*, to start to copy the files. Afterwards you will be refered that the installation process can take about 15 minutes. Answer this question with a click on *OK*. If you did not connect the Bluetooth Dongle until now you will be asked to do so during the installation of the driver. Now wait until the installation is finished and all files has been transferred to your computer.

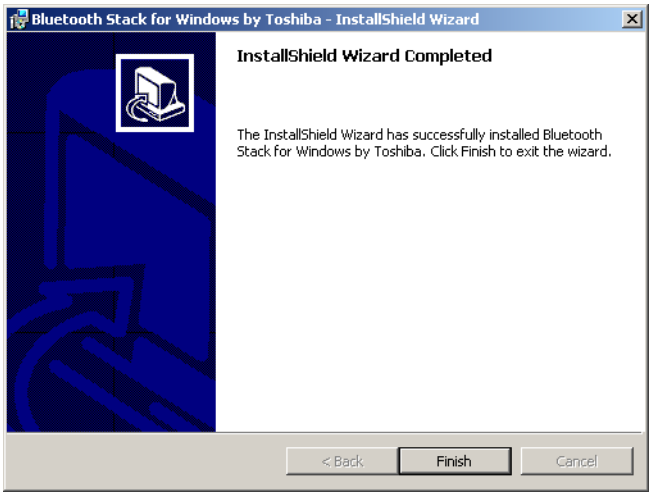

Bluetooth Stack for Windows by Toshiba - InstallShield Wizard
InstallShield Wizard Completed
The InstallShield Wizard has successfully installed Bluetooth Stack for Windows by Toshiba. Click Finish to exit the wizard.
< Back
Finish
Cancel

Figure 10: Bluetooth-Installation, Finish

As soon as the installation is finished, a dialog as in figure 10 appears. Click on the button *Finish*.

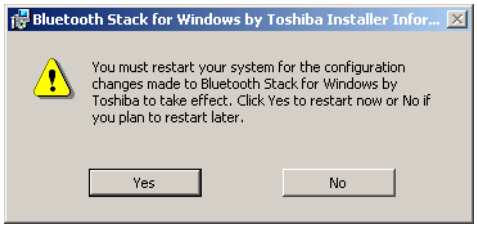

Bluetooth Stack for Windows by Toshiba Installer Infor...
You must restart your system for the configuration changes made to Bluetooth Stack for Windows by Toshiba to take effect. Click Yes to restart now or No if you plan to restart later.
Yes
No

Figure 11: Bluetooth-Installation, Reboot

To terminate the installation you have to reboot your computer. A message like in figure 11 will appear. Confirm it with a click on the button *Yes*.

6.2 Software Configuration

To find out on which COM-Port your Bluetooth connection is been installed, click on Start → Settings → Control Panel. Double click the entry *Bluetooth Local COM*. A dialog will open like it is represented in figure 12.

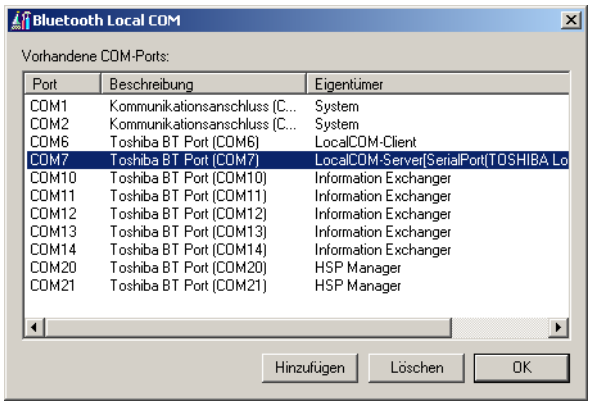

Bluetooth Local COM
Vorhandene COM-Ports:
Port Beschreibung Eigentümer
COM1 Kommunikationsanschluss (C... System
COM2 Kommunikationsanschluss (C... System
COM6 Toshiba BT Port (COM6) LocalCOM-Client
COM7 Toshiba BT Port (COM7) LocalCOM-Server[SerialPort(TOSHIBA Lo
COM10 Toshiba BT Port (COM10) Information Exchanger
COM11 Toshiba BT Port (COM11) Information Exchanger
COM12 Toshiba BT Port (COM12) Information Exchanger
COM13 Toshiba BT Port (COM13) Information Exchanger
COM14 Toshiba BT Port (COM14) Information Exchanger
COM20 Toshiba BT Port (COM20) HSP Manager
COM21 Toshiba BT Port (COM21) HSP Manager
Hinzufügen
Löschen
OK

Figure 12: Determining the given COM-Port

There you can find the entry *LocalCOM-Server[SerialPort(TOSHIBA LocalCOM)]*, which indicates on which COM-Port your Bluetooth Dongle has been installed. This COM-Port you always have to indicate for the data transmission to the software program.

6.3 Configurate connection

After installation and configuration of your Bluetooth connection you should test if the data transmission from your measuring instrument to the computer is working correctly.

Be sure that the USB Dongle is attached to your computer. Take your measuring instrument and power on the device. Select a operating mode, which includes the direct data transmission to PC. Additional information on direct data transmission to PC you can find in section 9 on page 29.

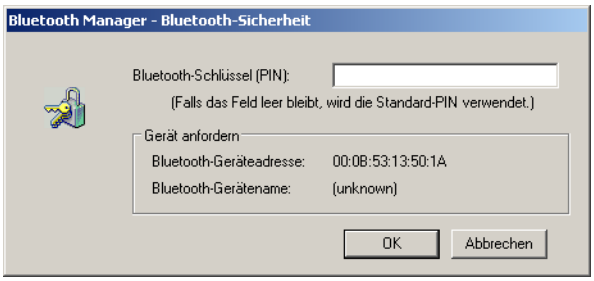


Figure 13:

As soon as you confirm your selected operating mode the device will try to get a radio connection to the computer. If this connection is successful a message like in figure 13 appears.

In this dialog you have to enter `OKM`. It is neccessary to write in capital letters!

7 Installation of Radio Transmission (Conceptronic)

This section describes the installation of the USB Bluetooth Dongle. Consider that the represented figures not necessarily agree with the current version of your operating system or the version of your USB installation.

The instructions in this chapter are only valid for the Conceptronic usb-drivers. If you are using the Toshiba usb-drivers, please read chapter 6.

7.1 Install Software & Drivers

Now it is time to install the software and driver on your system. Therefore you have to insert your Bluetooth CD into the CD ROM drive of your computer. If the CD does not start automatically, please double click on Desktop and then double click on the symbol of your CD ROM drive. With a further double click on file `autorun.exe` you start the installation.

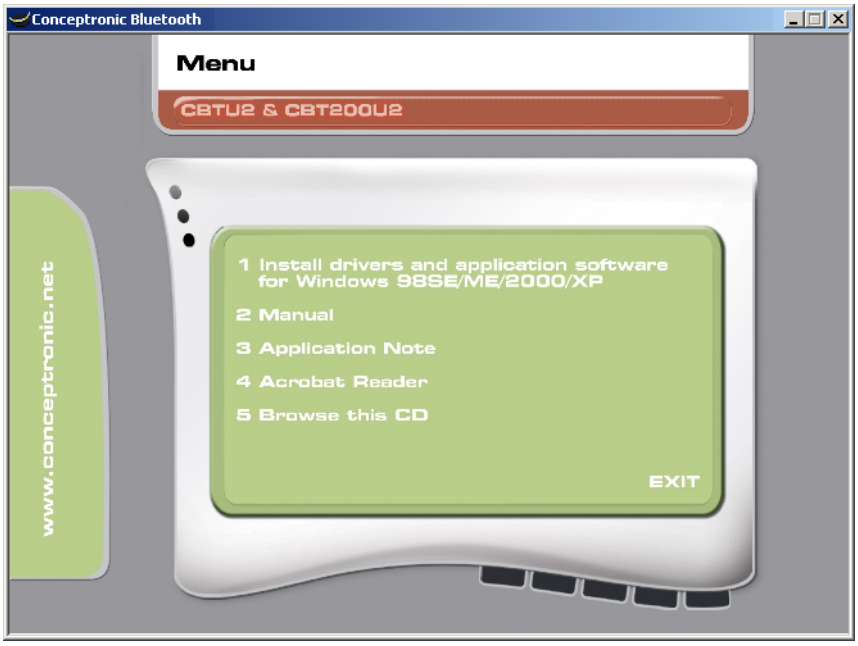


Figure 14: Bluetooth-Installation

The first window of your installation will open. Click here on the entry *1 Install drivers and application software* and follow the instructions on the screen.

Wählen Sie eine Setup-Sprache aus
Wählen Sie die Sprache dieser Installation aus der unten aufgeführten Auswahl aus.
Deutsch (Deutschland)
OK
Abbrechen

Figure 15: Bluetooth-Installation, Select Language

First there is a possibility to select the language of the installation. Click on *OK*, to change to the installation dialog from figure 16.

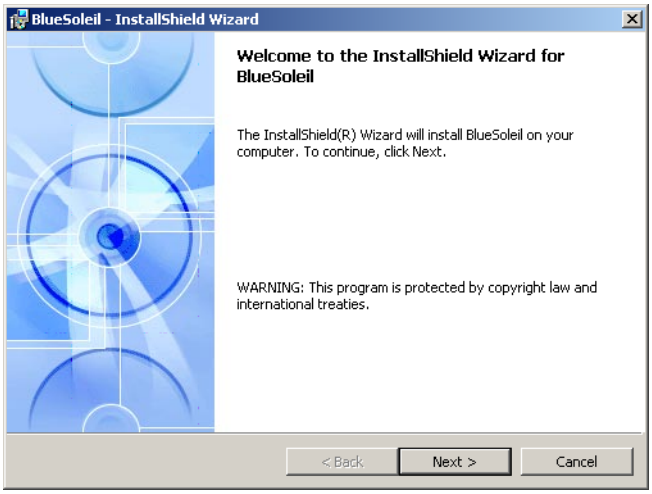

BlueSoleil - InstallShield Wizard
Welcome to the InstallShield Wizard for BlueSoleil
The InstallShield(R) Wizard will install BlueSoleil on your computer. To continue, click Next.
WARNING: This program is protected by copyright law and international treaties.
< Back
Next >
Cancel

Figure 16: Bluetooth-Installation, Start

Now simply click on *Next*, to continue the installation. A dialog like in figure 17 appears on your screen.

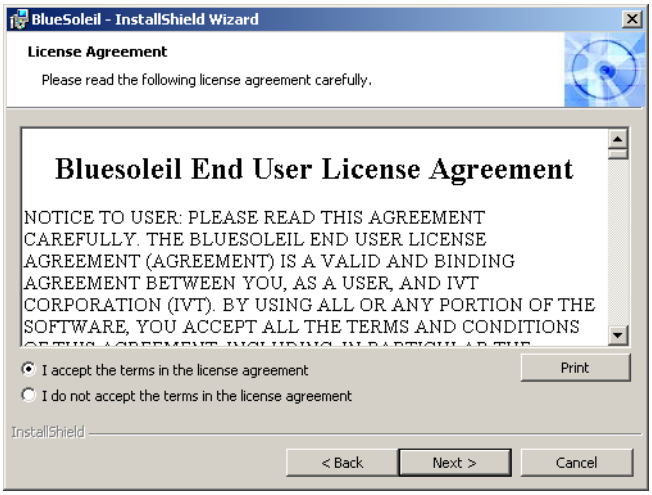

BlueSoleil - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
Bluesoleil End User License Agreement
NOTICE TO USER: PLEASE READ THIS AGREEMENT CAREFULLY. THE BLUESOLEIL END USER LICENSE AGREEMENT (AGREEMENT) IS A VALID AND BINDING AGREEMENT BETWEEN YOU, AS A USER, AND IVT CORPORATION (IVT). BY USING ALL OR ANY PORTION OF THE SOFTWARE, YOU ACCEPT ALL THE TERMS AND CONDITIONS
I accept the terms in the license agreement
I do not accept the terms in the license agreement
Print
InstallShield
< Back
Next >
Cancel

Figure 17: Bluetooth-Installation, Licence Agreement

Select the option *I accept the terms in the licence agreement* and confirm it with a click on *Next*.

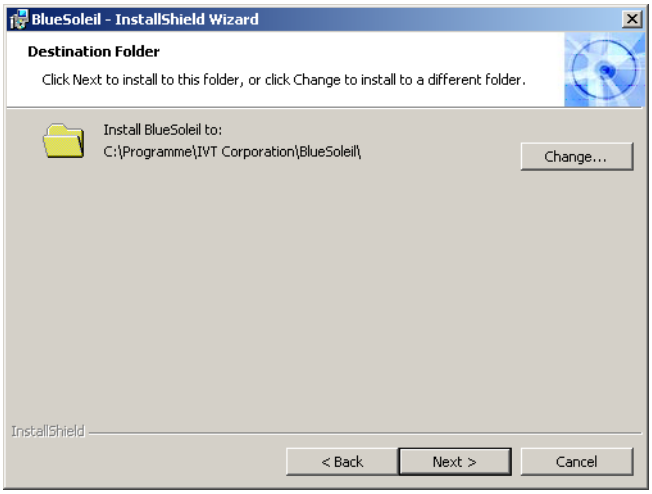


Figure 18: Bluetooth-Installation, Destination Folder

Inside the dialog from figure 18 you have the possibility to select another destination folder. Normally there is no changing necessary. Click only on the button *Next*.

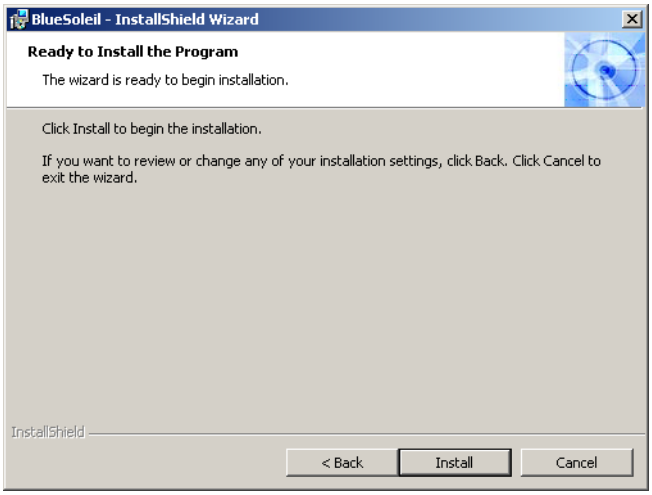

BlueSoleil - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

Figure 19: Bluetooth-Installation, Setup

Click now on the button *Install*, to start to copy the files. Now wait until the installation is finished and all files has been transferred to your computer.

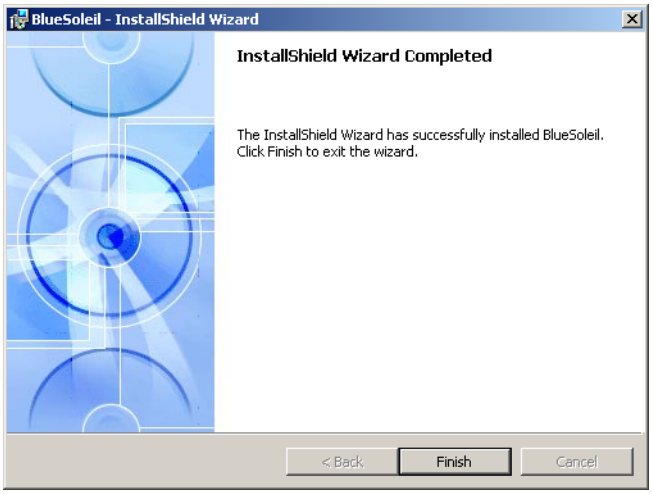


Figure 20: Bluetooth-Installation, Finish

As soon as the installation is finished, a dialog as in figure 20 appears. Click on the button *Finish*.

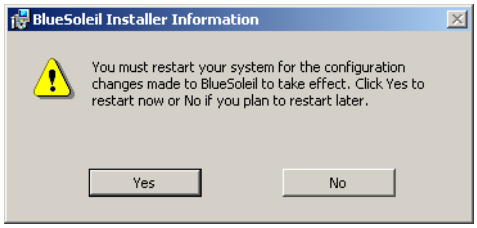

BlueSoleil Installer Information
You must restart your system for the configuration changes made to BlueSoleil to take effect. Click Yes to restart now or No if you plan to restart later.
Yes
No

Figure 21: Bluetooth-Installation, Reboot

To terminate the installation you have to reboot your computer. A message like in figure 21 will appear. Confirm it with a click on the button *Yes*.

7.2 Install Bluetooth-Dongle

After you have reboot the computer the message from figure 22 appears on your screen. Now you have to plug in the Bluetooth-Dongle into your computer.

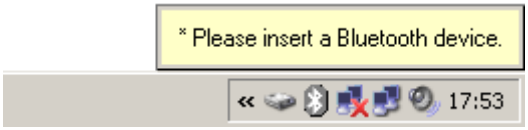


Figure 22: Bluetooth-Installation, Plug in the Bluetooth-Dongle

Now your computer tries to install automatically the Bluetooth-Dongle. Wait until a dialog window like in figure 23 appears on your screen. Click on the button *OK*.

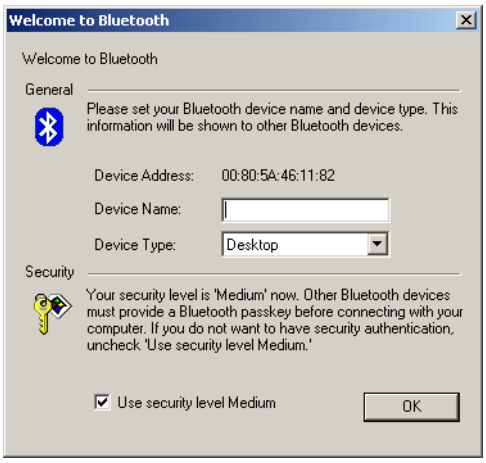

Welcome to Bluetooth
Welcome to Bluetooth
General
Please set your Bluetooth device name and device type. This information will be shown to other Bluetooth devices.
Device Address: 00:80:5A:46:11:82
Device Name:
Device Type: Desktop
Security
Your security level is 'Medium' now. Other Bluetooth devices must provide a Bluetooth passkey before connecting with your computer. If you do not want to have security authentication, uncheck 'Use security level Medium.'
Use security level Medium
OK

Figure 23: Bluetooth-Installation, Set up Bluetooth-Dongle

After a successful set up of the Bluetooth-Dongle the message from figure 24 appears on your screen.

Figure 24: Bluetooth-Installation, Bluetooth-Dongle has been installed

To find out on which COM-Port the Bluetooth connection has been installed you have to click with the right mouse button on the Bluetooth symbol in the task bar. A dialog window like in figure 25 will appear.

Figure 25: Find out the assigned COM-Port

If you click here on the entry *Display* a window like represented in figure 26 will open. Select in the menu *View* the option *Service Window*.

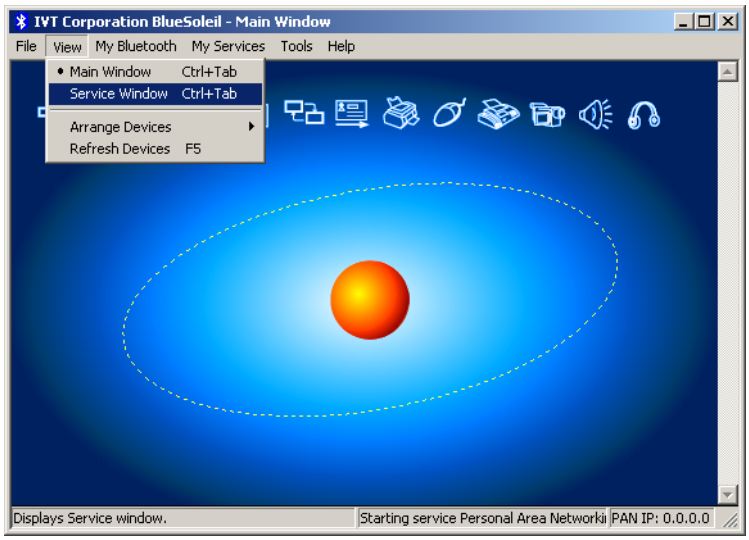


Figure 26: Find out the assigned COM-Port

An image like in figure 27 is represented. Behind the indication *Serial Port A* you can read the number of the assigned COM-Port. In this figure it is *COM7*, this can be different on your computer!

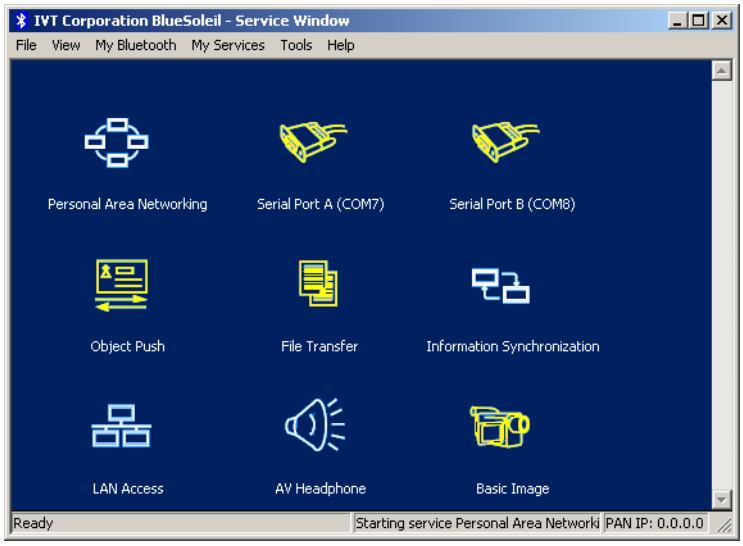


Figure 27: Find out the assigned COM-Port

7.3 Configurate connection

After installation and configuration of your Bluetooth connection you should test if the data transmission from your measuring instrument to the computer is working correctly.

Be sure that the USB Dongle is attached to your computer. Take your measuring instrument and power on the device. Select a operating mode, which includes the direct data transmission to PC. Additional information on direct data transmission to PC you can find in section 9 on page 29.

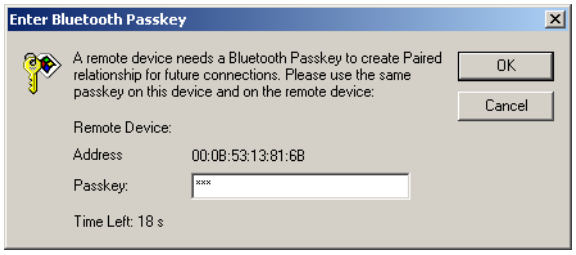

Enter Bluetooth Passkey
A remote device needs a Bluetooth Passkey to create Paired relationship for future connections. Please use the same passkey on this device and on the remote device:
OK
Cancel
Remote Device:
Address 00:0B:53:13:81:6B
Passkey:
***
Time Left: 18 s

Figure 28: USB-Connection, Enter PIN-Code

As soon as you confirm your selected operating mode the device will try to get a radio connection to the computer. If this connection is successful a message like in figure 28 appears. In this dialog you have to enter `OKM`. It is neccessary to write in capital letters! Confirm this entry by a click on the button *OK*.

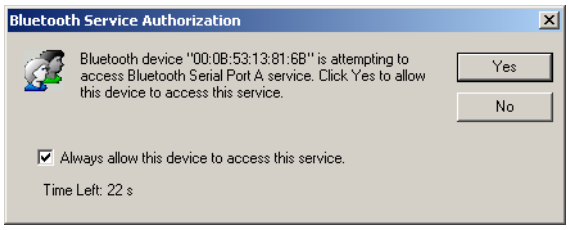

Bluetooth Service Authorization
Bluetooth device "00:0B:53:13:81:6B" is attempting to access Bluetooth Serial Port A service. Click Yes to allow this device to access this service.
Yes
No
Always allow this device to access this service.
Time Left: 22 s

Figure 29: USB-Connection, Confirm Access

Another window will open where you mark the entry *Allways allow this device to access this service* and confirm this entry by a click on *Yes*.

Figure 30: USB-Connection, Connection established

The message from figure 30 indicates that the connection is established. Now you have set up successfully your Bluetooth connection.

8 Control Elements

In this section you will learn more about the fundamental use of all control elements for this measuring instrument. All connections, inputs and outputs are explained in detail.

8.1 Front View

Figure 31 shows the front side of the device.

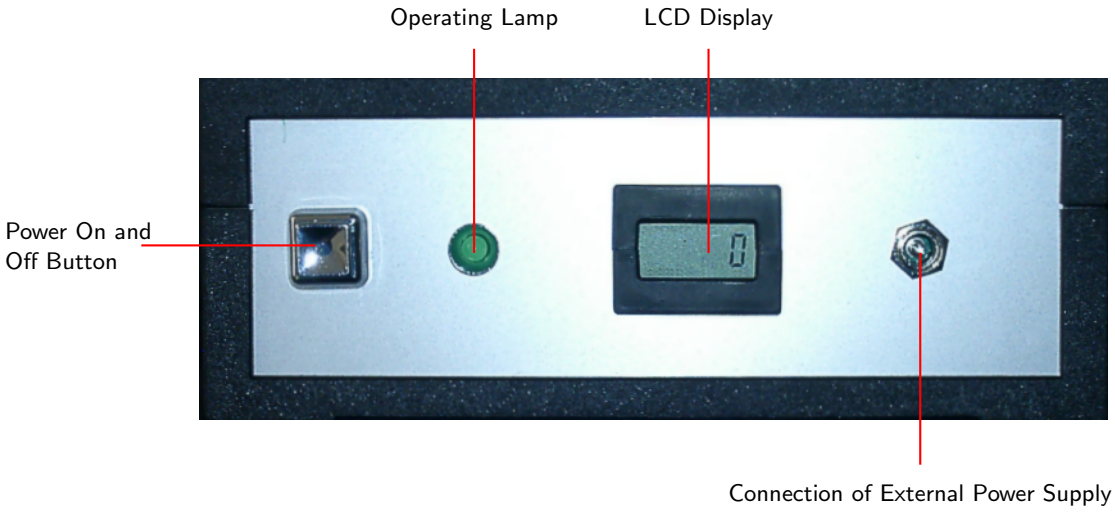


Figure 31: Front View

The Power On and Off Button is used to switch on and off the control unit. Before operating with your device you have to be sure that the device is charged.

The Operating Lamp shines, when the device is powered on and indicates the operating readiness of the control unit.

The LCD Display indicates how often the device was powered on. This display is only of interest for the repair and maintenance service.

On the Connection of External Power Supply the external battery has to be connected. Be sure that the battery is full charged before operation.

8.2 Back View

Figure 32 shows the back side of the control unit with all connections.

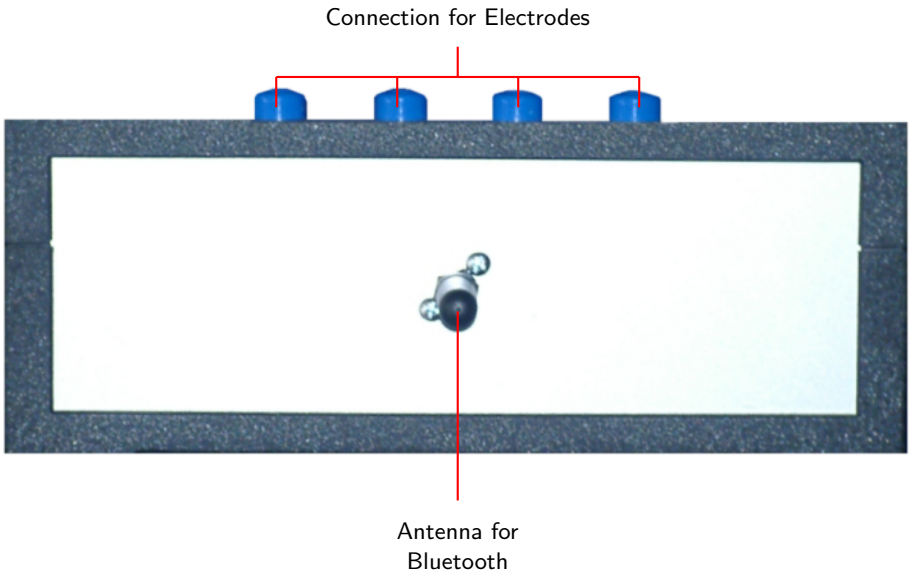


Figure 32: Back View

The Connection for Electrodes is used to connect the delivered electrodes for cavity detection.

The Antenna for Bluetooth is used for the data transmission to a connected pc and exists only for *Cavefinder B*.

8.3 Touchpad for Menu Navigation

The top of the device is including a touchpad like in figure 33. The represented buttons have no particular use in both models of the Cavefinder and are not necessary for operating the device.

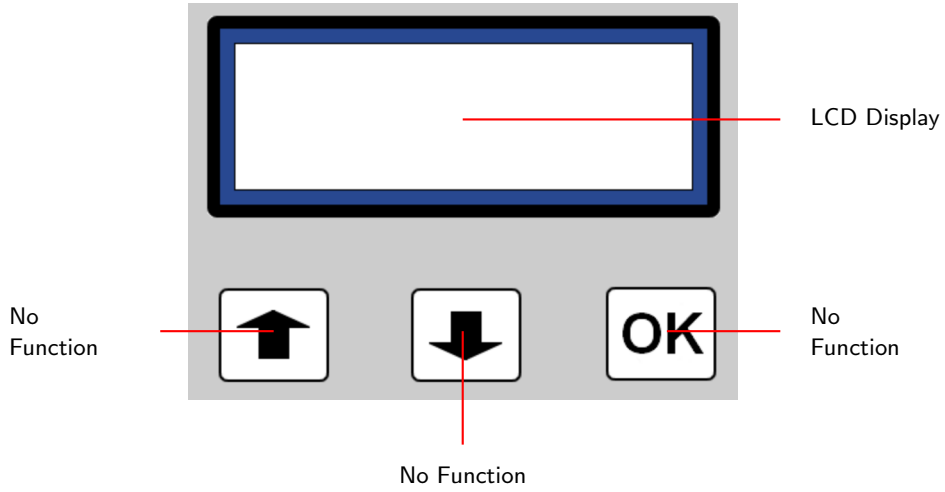


Figure 33: Touchpad for Menu Navigation

9 Detection of Cavities

The *Cavefinder* offers you a geo-electrical measuring method to detect all kind of cavities. The device is not able to determine the exact depth of a located cavity.

There are four connections for the electrodes on the control unit. You have to keep a certain manner to connect the electrodes in the right way. The correct connection is represented in figure 34.

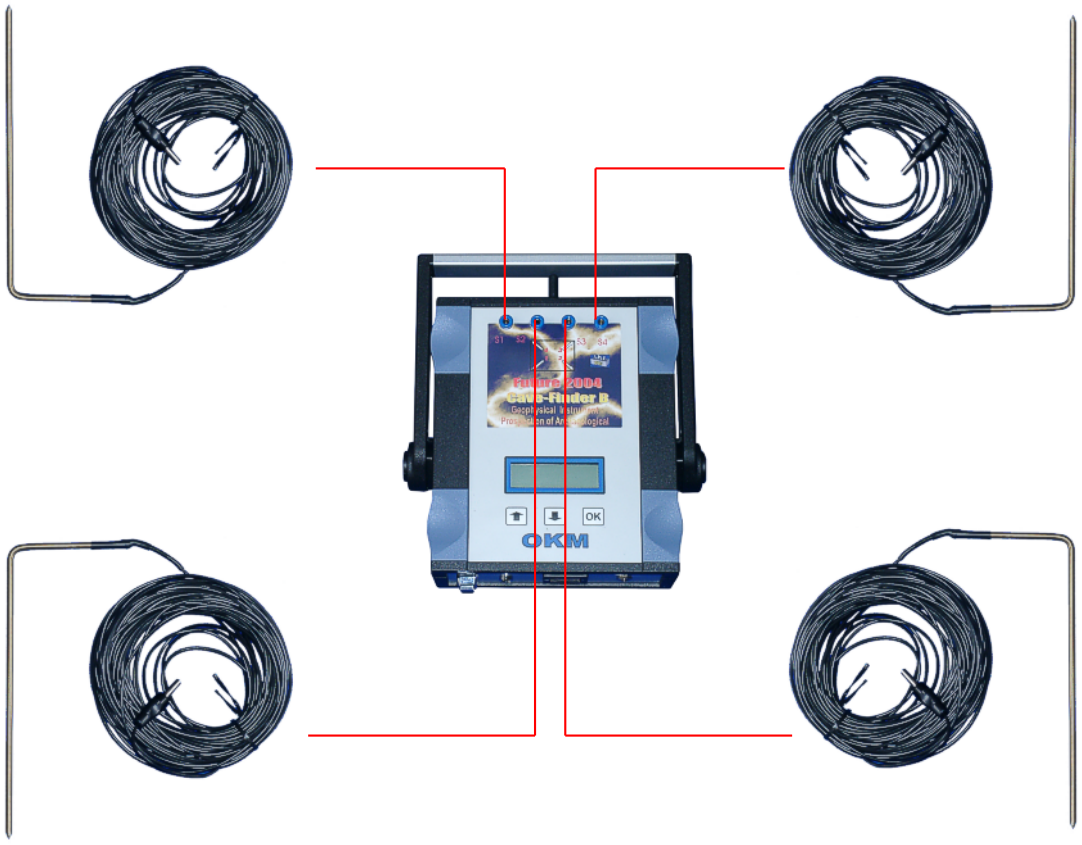


Figure 34: Connection of Electrodes

Try to define a square area with the four electrodes and connect the cables to the main unit. Therefore you have to plug in the electrode cable of the upper left electrode in the first connection of the device from left to right. The following electrode cable which is placed next to it counter clockwise has to be plugged into the next connection. Go on in the same direction until all electrodes are connected.

To perform a measurement plug in the electrodes like explained above and connect them in the correct way. Power on the device and wait until the result is represented on the display. If a cavity is been detected inside your defined area the message *Cave = Yes* appears on the display, if there is no cavity the message *Cave = No* will be shown.

If this is your first measurement it is adviced to define a wide area to find out in generally if there

is a cavity or not. To detect the exact location of a cavity (if a cavity exists) split your measured field in four smaller parts and repeat the measurement in every subsection. This method you can repeat as often as you like until you found the exact location of the cavity.

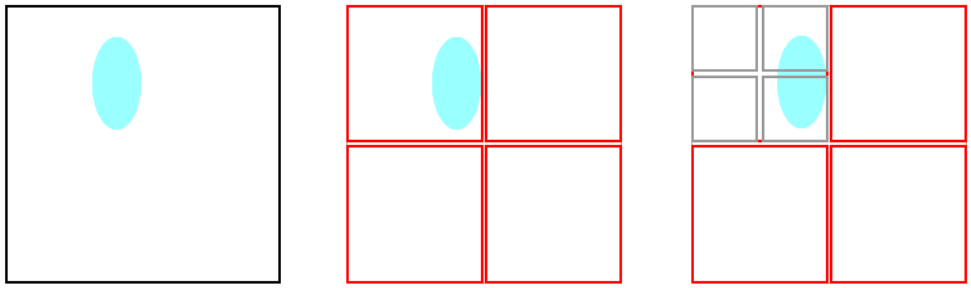


Figure 35: Rarefy a Measurement

In figure 35 the explained measuring method is represented once again. At first measure the wide area which is here represented in black color. On the display of the device the message *Cave = Yes* appears. Then devide this area in four smaller subsections and repeat your measurement inside these red represented fields again. Only in the upper left field the result *Cave = Yes* will be shown. All other fields will indicate the message *Cave = No* on the display. Now you can split this red marked subsection again to specify the position and size of the detected cavity.

With model Cavefinder B *additionally you can transfer data to a connected computer. The measured data will only be transferred to a pc if the result is* Cave = Yes. *As a correct number of impulses you have to enter* **4** *when you prepare the software program. Further information about the software you can find in the appropriate user's manual for software!*

10 Danger of Explosion during Excavation

Unfortunately, the last two world wars also made the ground in many places of the world a potentially explosive scrap heap. A host of those lethal relics are still buried in the ground. Do not start digging and hacking for an object wildly when you receive a signal of a piece of metal from your device. Firstly, you might indeed cause irreparable damage to a truly rare find, and secondly, there is a chance that the object reacts in an insulted way and strikes back.

Note the colour of the ground close to the surface. A red or reddish color of the ground is an indicator of rust traces. As regards the finds themselves, you should definitely pay attention to their shape. Curved or round objects should be a sign of alarm, especially if buttons, rings or little pegs can be identified or felt. The same applies to recognizable ammunition or bullets and shells. Leave that stuff where it is, do not touch anything and, most importantly, do not take any of it home with you. The killing machines of war made use of diabolical inventions such as rocker fuses, acid fuses and ball fuses. Those components have been rusting away in the course of time, and the slightest movement may cause parts of them to break and be triggered. Even seemingly harmless objects such as cartridges or large ammunition are anything but that.

Explosives may have become crystalline over time, that is, sugar-like crystals have formed. Moving such an object may cause those crystals to produce friction, leading to an explosion. If you come across such relics, mark the place and do not fail to report the find to the police. Such objects always pose a danger to the life of hikers, walkers, farmers or children.

11 Maintenance and Services

In this section you will learn how to maintain your measuring instrument with all included accessories to keep it in good condition a long time and to get good measuring results.

The following list indicates what you absolutely should avoid:

- penetrating water
- strong dirt and dust deposits
- hard impacts
- strong magnetic fields
- high and long lasting heat effect

If you want to clean your device please use a dry rag of soft material. To avoid any damage you should transport the device and accessories always in the appropriate carrying cases.

Beware that all batteries and accumulators are always charged fully while operating with your system. You should only load the batteries when they are completely discharged no matter if you are working with the external power supply or with the internal accumulators. In this way a long durability of the used batteries is guaranteed.

To load the external and internal batteries you have to use only chargers which are part of our scope of delivery.

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